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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/587,900	Applicant(s) KAJIWARA ET AL.
	Examiner EUENG-NAN YEH	Art Unit 2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If no period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED. (35 U.S.C. § 133).

Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 17 August 2009.

2a) This action is FINAL. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-44 is/are pending in the application.

4a) Of the above claim(s) 1-30 is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 31-44 is/are rejected.

7) Claim(s) _____ is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on 28 July 2006 is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some * c) None of:

1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) Notice of References Cited (PTO-892)

2) Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) Information Disclosure Statement(s) (PTO-166a)
Paper No(s)/Mail Date See Continuation Sheet

4) Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____

5) Notice of Informal Patent Application

6) Other: _____

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date
:09/16/2009,02/27/2009,10/25/2006,07/28/2006.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Election/Restrictions

2. Claims 1-30, wherein claims 1-13 and 27-30 for Species I and claims 14-26 for Species II, are withdrawn from examination. Applicant's election was made without traverse for Species III, corresponding to claims 31-44, in the reply filed on August 17, 2009 is acknowledged.

Drawings

3. The drawings are objected to because of following minor informalities:

Figures 20-22 should be designated by a legend such as --**Prior Art**-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief

description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

4. The abstract of the disclosure is objected to because it exceeds the 150 words limitation. The content of a patent abstract should be such as to enable the reader thereof, regardless of his or her degree of familiarity with patent documents, to determine quickly from a cursory inspection of the nature and gist of the technical disclosure and should include that which is new in the art to which the invention pertains. The abstract should not refer to purported merits or speculative applications of the invention and should not compare the invention with the prior art. The abstract should be in a brief narrative of the disclosure as a whole. It should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details. The language should be clear and concise and should not repeat information given in the title and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. Correction is required. See MPEP § 608.01(b).

Claim Rejections - 35 USC § 101

5. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The USPTO "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" (Official Gazette notice of 22 November 2005), Annex IV, reads as follows:

Descriptive material can be characterized as either "functional descriptive material" or "nonfunctional descriptive material." In this context, "functional descriptive material" consists of data structures and computer programs which impart functionality when employed as a computer component. (The definition of "data structure" is "a physical or logical relationship among data elements, designed to support specific data manipulation functions." The New IEEE Standard Dictionary of Electrical and Electronics Terms 308 (5th ed. 1993).) "Nonfunctional descriptive material" includes but is not limited to music, literary works and a compilation or mere arrangement of data.

When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized. Compare *In re Lowry*, 32 F.3d 1579, 1583-84, 32 USPQ2d 1031, 1035 (Fed. Cir. 1994) (claim to data structure stored on a computer readable medium that increases computer efficiency held statutory) and *Warmerdam*, 33 F.3d at 1360-61, 31 USPQ2d at 1759 (claim to computer having a specific data structure stored in memory held statutory product-by-process claim) with *Warmerdam*, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure per se held nonstatutory).

In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See *Lowry*, 32 F.3d at 1583-84, 32 USPQ2d at 1035.

Claims 37 and 43 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter as follows. Claims 37 and 43 define a computer program embodying functional descriptive material. However, the claim does not define a computer-readable medium or computer-readable memory and is thus non-statutory for that reason (i.e., "When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized" – Guidelines Annex IV). The scope of the presently claimed invention encompasses products that are not necessarily computer readable, and thus NOT able to impart any functionality of the

recited program. The examiner suggests amending the claim(s) to embody the program on "a non-transitory computer-readable medium" or equivalent such as "A non-transitory computer readable medium stores a program ..."; assuming the specification does define such medium and does NOT define the computer readable medium as a "signal", "carrier wave", or "transmission medium" which are deemed non-statutory (refer to "note" below). Any amendment to the claim should be commensurate with its corresponding disclosure.

Note:

A "signal" (or equivalent) embodying functional descriptive material is neither a process nor a product (i.e., a tangible "thing") and therefore does not fall within one of the four statutory classes of § 101. Rather, "signal" is a form of energy, in the absence of any physical structure or tangible material.

Should the full scope of the claim as properly read in light of the disclosure encompass non-statutory subject matter such as a "signal", the claim as a whole would be non-statutory. In the case where the specification defines the computer readable medium or memory as statutory tangible products such as a hard drive, ROM, RAM, etc, as well as a non-statutory entity such as a "signal", "carrier wave", or "transmission medium", the examiner suggests amending the claim to include the disclosed tangible computer readable media, while at the same time excluding the intangible media such as signals, carrier waves, etc.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 31, 32, and 36-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Lee et al. (US 6,351,491 B1) and Nguyen et al. (US 6,205,252 B1).

Regarding claims 31 (apparatus), 36 (method), and 37 (program), Lee discloses a codec system comprising:

- decomposing a frame into a plurality of subbands having different frequency components (as depicted in figure 1 for DWT decomposition of input frames. See also figure 3 for hierarchical subbands. As depicted in figure 10 wherein Memory and CPU can be used to store programs and execute data processing);

- generating motion vector information and predicted value information on the basis of motion compensation target data of a current frame and decoded data corresponding to the motion compensation target data obtained when a preceding frame is coded (as depicted in figure 1, numeral 104, "...the encoder 100 performs three broad functions: first, it produces a plurality of motion vectors that represent motion that occurs between frames; second, it predicts the present frame using a reconstructed version of the previous frame combined with the motion vectors ..." at column 4, line 18);

- first coding means for obtaining a difference value between predicted value information generated by said motion compensation means and the motion compensation target data in the current frame and coding the difference value and the motion vector information (as depicted in figure 1, numeral 102, "... and third, the predicted frame is subtracted from the present frame to produce a frame of residuals that are coded and transmitted along with the motion vectors to a receiver ..." at column 4, line 23);

- second coding means for coding data of each frequency component coefficient (as depicted in figure 2, "...The input image is typically a pixelated (digitized) photographic image as can be produced from an image scanner or a computer graphics system. However, the input image can also be a frame within a series of frames of video images or a motion compensated residual frame produced by a video encoding system ..." at column 4, line 37. Thus, coefficient of each frequency component can be coded without go through the motion compensation process);

Lee does not explicitly disclose the data extraction and data multiplexing.

Nguyen, in the field of endeavor of "hierarchical vector quantization" at column 1, line 12, teaches a methodology "to separate each data word into its most and least significant parts, and apply a different compression procedure to each part" at column 1, line 53. As depicted in figure 3, "...when a single code word 31 is split into most and least significant parts, 32, 33, and where only the least significant bits are compressed. In this case bits 0 through 4 are sent through lossy compressor 35 while bits 5 through 7 are not. Both are then compressed using lossless LZ compression, combined in

combiner 37 and output to the decoder shown in FIG. 4 ..." at column 2, line 66. See also figure 5, "where a single pixel is separated into a least significant segment and a most significant segment, and where a separate and different compression process is used for each segment, the least significant bits being more compressed. The original pixel is separated into its most significant bits 52 and least significant bits 53. The result is that the most significant bits, being the most important, are less compressed while compression for the least significant bits has a better compression ratio" at column 3, line 12. Thus, Nguyen in combination with Lee discloses:

- a) A threshold bit, TB, such as TB=5 to extract subband data of upper bits, such as bits 5-7, to represent most important of subband data for motion compensation processing.
- b) A threshold bit, TB, such as TB=5 to extract subband data of lower bits, such as bits 0-4, to represent less important of subband data for non motion compensation processing.
- c) A combiner, i.e. multiplexing, to combine above TB separated codes together to produce output.

It would have been obvious at the time the invention was made, that one of ordinary skill in the art would have been motivated to include the codec system Lee made with the application of TB extraction methodology as taught by Nguyen, with different compression algorithms "to optimize the entire process" at column 1, line 57.

Regarding claim 32, said decomposition means comprises means for decomposing a frame into a plurality of subbands on the basis of a discrete wavelet transformation method (discussed in claim 31 for DWT decomposition).

Regarding claim 38, a computer readable storage medium storing a computer program as set forth in claim 37 ("the encoder 1016 (*Lee figure 10*) can be represented by a software application which is loaded from a storage device and resides in the memory 1012 of the computer. As such, the encoder 100 and 106 of the present invention can be stored on a computer readable medium" at Lee column 10, line 56).

8. Claims 33, 39, and 42-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Lee and Nguyen as applied to claim 31 discussed above, and further in view of Maeda et al. (US 2002/0018598 A1).

Regarding claim 33, the combination of Lee and Nguyen discloses the coding of DWT coefficients with less significant bits. The Lee and Nguyen combination does not explicitly disclose the each bitplane coding.

Maeda, in the field of endeavor of "image processing apparatus and method for encoding/decoding an image, and a computer readable memory" in paragraph 1, line 1, teaches the need for JPEG2000 type compression, "coding that can assure higher functions and higher image quality than JPEG used so far is demanded. For this reason, ISO is laying down new still image coding standards. This activity is generally called "JPEG2000" ..." in paragraph 2, line 6. "The entropy encoder 2005 (*figure 20*)

decomposes the input quantization indices into bit planes, executes binary arithmetic coding in units of bit planes, and outputs code streams in units of bit planes" in paragraph 93, line 1. The bitplane coding is depicted in figure 16B, "... binary arithmetic coding of bits of the most significant bit plane (indicated by MSB in FIG. 16B) first, and outputs the coding result as a bitstream. Then, the encoder 1004 lowers the bit plane by one level, and encodes and outputs bits of each bit plane to the code output unit 1005 ..." in paragraph 77, line 5.

It would have been obvious at the time the invention was made, that one of ordinary skill in the art would have been motivated to include the codec system of the combination of Lee and Nguyen, with the application of bitplane coding methodology as taught by Maeda, such that to have a higher image quality as discussed above.

Regarding claims 39 (apparatus), 42 (method), and 43 (program): - separating code data of an input frame into first code data corresponding to motion compensation target data and second code data corresponding to non motion compensation target data (as discussed in claim 31 by the combination of Lee and Nguyen for the motion compensation target data and non motion compensation target data. As shown in Nguyen figure 4 wherein the numeral 45 receives and separates the coded data. As depicted in Lee figure 10 wherein Memory and CPU can be used to store programs and execute data processing);

- first decoding means for generating decoded data of upper bits of each subband in a current frame on the basis of a difference value and motion vector

information with respect to data of the upper bits of each subband in the current frame obtained by decoding the separated first code data and decoded data of motion compensation data in a preceding frame (as discussed in claim 31 for the motion information. As depicted in Nguyen figure 4 #42 or figure 2 #24 decodes the upper bits of data corresponding to motion data);

- second decoding means for decoding the second code data (as depicted in Nguyen figure 4 #41 or figure 2 #21);
 - generating frequency component data of each subband in the current frame by combining the decoded data of the lower bits of each subband obtained by said second decoding means and the decoded data of the upper bits of each subband obtained by said first decoding means (as depicted in Nguyen figure 4 #44 or figure 2 #23);
 - reconstructing an image of the current frame by performing processing inverse to said decomposition means for the frequency component data of the subband generated by said generation means (as depicted in Maeda figure 9, numeral 957 for the inverse discrete wavelet transformation and numeral 958 for the output of the reconstructed image).

Regarding claim 44, a computer readable storage medium storing a computer program as set forth in claim 43 ("Referring to FIG. 6, reference numeral 500 denotes a central processing unit (CPU) for controlling the overall image processing apparatus and making various processes. Reference numeral 501 denotes a memory which stores an operating system (OS) and software required for controlling the image processing

..." in Maeda paragraph 142, line 1. As depicted in Lee figure 10 wherein Memory and CPU can also be used to store programs and execute data processing).

9. Claims 40 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Lee, Nguyen, and Maeda as applied to claim 39 discussed above, and further in view of Itokawa (US 2001/0033620 A1).

Regarding claim 40: a moving image decoding apparatus decoding moving image data, wherein the said data is coded by a moving image coding apparatus (the coding apparatus has been discussed in claim 31), comprising:

- separating code data of an input frame into first code data corresponding to motion compensation target data and second code data corresponding to non motion compensation target data (discussed in claim 39 for separating code data);

- first decoding means for generating decoded data of upper bits of each subband in a current frame on the basis of a difference value and motion vector information with respect to data of the upper bits of each subband in the current frame obtained by decoding the separated first code data and decoded data of motion compensation data in a preceding frame (discussed in claim 39 first decoding means for);

- second decoding means for decoding the second code data (discussed in claim 39 second decoding means for);

- generating frequency component data of each subband in the current frame by combining the decoded data of the lower bits of each subband obtained by said second

decoding means and the decoded data of the upper bits of each subband obtained by said first decoding means (discussed in claim 39 for generating frequency component);

- reconstructing an image of the current frame by performing processing inverse to said decomposition means for the frequency component data of the subband generated by said generation means (discussed in claim 39 by Maeda for the reconstructing an image);

- said moving image decoding apparatus further comprising, when said moving image decoding apparatus decodes moving image data coded by a moving image coding apparatus as set forth in claim 33 (as depicted in Maeda figure 24, step S54, the bit plane number BN which was coded according claim 33 will be checked and bit plane will be decoded during the decoding process).

The combination of Lee, Nguyen, and Maeda does not explicitly disclose the bitplane other than data to be decoded.

Itokawa, in the field of endeavor of "an apparatus of decoding a moving picture, a control method therefore, and a store medium" in paragraph 1, line 1, teaches a methodology to define number of code data of bitplanes within measured time for the sync control, "The sync controller 106a (*figure 1*) detects the times at which the header of an access unit should be read and decoding 1 should end processing. If decoder 1 cannot complete processing within a necessary processing time, the following control is done for the decoding buffer 102a and decoding unit 103a" in paragraph 111, line 1. As depicted in figure 2, "... the current time exceeds the processing limit time assigned to this packet is monitored in step S204. For convenience, the time till the reception timing

of the next frame may be assumed as an assigned maximum decoding processing time. Within the assigned processing limit time, the current data is kept decoded. If a bit stream is SNR scalable, respective subband data are arranged from the low-frequency side to the high-frequency side for each bit plane. An example is bit planes included in the code stream shown in FIG. 16A. If the number of bits assigned to each subband changes, the number of subbands on the MSB side is smaller than that on the LSB side. In this example, the number of subbands on the MSB side is three, LL, HL2, and LH2. The first current data in FIG. 2 is an LL band of a bit plane (S-1)" in paragraph 112, line 6. Furthermore, "...and decoding of all the data included in the bit plane (S-1) ends. After step S207, the flow shifts to processing of a bit plane BitsS-2 in step S208 ..." in paragraph 113, line 3. "FIG. 4A shows an entire encoded stream which should be originally decoded, and FIG. 4B shows data decoded partway owing to a short processing time. In this example, the final bit plane Bit0, and HL1, LH1 and HH1 of the bit plane Bit1 are not decoded" in paragraph 115, line 6. Thus, Itokawa determined bitplanes from bit 0 to bit 1 etc. for data not be decoded.

It would have been obvious at the time the invention was made, that one of ordinary skill in the art would have been motivated to include the codec system of the combination of Lee, Nguyen, and Maeda, with application of bitplanes determination methodology for data not be decoded as taught by Itokawa, for the sync control as stated above.

Regarding claim 41, wherein said setting means increases the number of bitplanes which are not to be decoded with respect to a subband in which frequency components gradually decrease in frequency, when a time required to reconstruct one preceding frame is measured, and a value of the measured time is larger than a first threshold, and decreases the number of bitplanes which are not to be decoded with respect to a subband in which frequency components gradually increase in frequency, when the value of the measured time is smaller than a second threshold (as depicted in Itokawa figures 25A and 25B, "FIG. 25A shows an entire encoded stream which should be originally decoded, and FIG. 25B shows data decoded partway owing to a short processing time. In this example, data can only be decoded up to the intermediate bit plane BitS-2 in the intermediate subband HH2" in paragraph 142, line 1. This is to say that if the process spends more time on significant bits (high bits) and major scenes (low frequency subbands), then the number of bitplanes for data not be decoded will increase, for example increases from Bit S-3 to Bit S-2, because significant bits consume most of the processing time and the subband frequency components will gradually decrease towards low frequency subbands because low frequency subbands consume most of the processing time. Under short processing time, the number of bitplanes for data not be decoded will decrease, for example decreases from Bit 1 to Bit 0 and subband frequency components will gradually increase towards high frequency subbands.)

10. Claims 34 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Lee, Nguyen, and Maeda as applied to claim 33 discussed above, and further in view of Niimura et al. (US 5,450,209).

Regarding claim 34, the combination of Lee, Nguyen, and Maeda discloses the threshold bitplane selection. The combination of Lee, Nguyen, and Maeda does not explicitly disclose bitplane for non coding target.

Niimura, in the field of endeavor of "band compression based on a combination of intra-frame coding and inter-frame coding, and which allows a recording/reproducing device to easily reproduce a good image" at column 1, line 9, discloses a methodology to shift bit to control the code amount as shown in figure 122, numerals 97 and 98, "code amount calculator 98 calculates the amount of codes which the quantizer 15 outputs. Whenever the code amount exceeds a reference value, the calculator 98 supplies a switching signal to the target code amount circuit 97. Alternatively, the calculator 98 may monitor the rate at which the amount of codes the quantizer 15 produces, and may predict whether or not the codes amount overflows one track" at column 79, line 21. "The shift register shifts the bits to the left or the right, thereby controlling the amount of output data" at column 79, line 63. Thus, Niimura discloses a methodology to select bits to be shifted for non coding targets based on the code amount.

It would have been obvious at the time the invention was made, that one of ordinary skill in the art would have been motivated to include the codec system of the

combination of Lee, Nguyen, and Maeda, with the application of bit shift methodology as taught by Niimura, to avoid overflow as discussed above.

Regarding claim 35, the threshold TB set for each subband is 0 for subbands of low frequency components ("The result is that the most significant bits, being the most important, are less compressed while compression for the least significant bits has a better compression ratio. A programmable look-up table could be used to split the input pixel into any two segments other than the 3-5 split ..." at Nguyen column 3, line 17. Without departing from the scope and spirit of Nguyen's methodology, the TB setting for the most important part of DWT subbands, the low frequency components can be 0).

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eueng-nan Yeh whose telephone number is 571-270-1586. The examiner can normally be reached on Monday-Friday 8AM-4:30PM EDT.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vikkram Bali can be reached on 571-272-7415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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